REMARKS

Upon entry of the instant amendment, claims 1-20 are pending. Claims 1, 4, 5, 11, 13 and 15 have been amended to more particularly point out the Applicant's invention. It is respectfully submitted that the claims, as amended, define patentable subject matter over the references of record.

Drawing

A revised set of formal drawings is being sent to the Official Draftsperson by mail. A copy of the drawings and the Letter to the Official Draftsperson are attached herewith. These drawings have been revised to include a label for FIG. 3. Accordingly, this objection should be obviated.

Specification

The specification was objected to because of an informality relating to reference numeral 24 on page 2, line 22 of the specification. A proposed amendment to the specification is included herewith which deletes the reference numeral 24 and replaces it with reference numeral 21 to correspond to FIG. 1 of the drawing. Accordingly, this rejection should be obviated.

Claim Rejections – 35 USC 112

Claims 3 and 13 have been rejected under 35 USC 112, second paragraph, for allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular, these claims were rejected based on the lack of antecedent basis for the phrase "divided signals". Claims 3 and 13 have been amended to delete the phrase "divided signals". Accordingly, this rejection should be obviated.

Claim Rejections – 35 USC 103

Claims 1-20 have been rejected under 35 USC 103(a) as being unpatentable over Greenberg U.S. Patent No. 5,519,356 in view of Patel et al U.S. Patent No. 5,491,698. It is respectfully submitted that neither the Greenberg nor the Patel et al. patents disclose or suggest a demodulation system as recited in the claims at issue. More particularly, we agree with the statement in paragraph 4 of the Detailed Action that the Greenberg patent does not disclose a means for adjusting the boundaries as a function of the distance and decoding the signals as a function of the adjusted boundaries. It is also respectfully submitted that the Patel et al. patent likewise does not disclose a demodulation system as recited in the claims at issue. Although the Patel et al. patent discloses a demodulator with a method for adjusting the decision boundaries, the method for adjusting the decision boundaries is totally different than the method recited in the claims at issue. In particular, the Patel et al. patent teaches adjusting the decision boundaries as a function of the number of detected data points above and below the decision boundaries. More particularly, as recited in the

Patel et al. patent (column 2, line 61 – column 3, line 3), "In each method, separate counters count as potential error events in the detected data those which are determined to be both above and below a selected one of the decision boundaries as a result of a "1" being potentially misdetected as a "0" (corresponding to a N pattern being potentially misinterpreted as an M pattern), and vice versa. **The selected decision boundary is adjusted in a direction toward providing a substantially equal number of potential error events at each side of the boundary**" (emphasis added).

The claims at issue, on the other hand, adjust the decision boundaries as a function of the distance between the received signals and the initial decision boundaries. Thus, the claimed system has nothing to do with moving the decision boundaries such that an equal number of potential error events occur on each side of the boundary. As such, it is respectfully submitted that the Patel et al. patent actually teaches away from the invention recited in the claims at issue. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-20.

An earnest attempt has been made to address each and every one of the issues set forth in the Official Action. An early allowance is solicited.

Respectfully submitted,

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ATTACHMENT FOR SPECIFICATION
VERSION WITH MARKINGS TO SHOW CHANGES MADE
U.S. Serial No. 09/240,275; Filed: January 29, 1999

Please add the following paragraph on page 1 after the title "Adaptive Decision Regions and Metrics".

<u>The U.S. Government has certain rights in this invention pursuant to the clause at FAR 52.227-12.</u>

Please modify the paragraph on page 2, lines 17-27 as follows:

Decoding of PSK and QAM modulated signals is also known in the art. In general, the PSK or QAM signal is received, demodulated, filtered and sampled. The sample is known as the decision variable. For example, the QPSK constellation illustrated in FIG. 1 can be divided into four symmetric decision regions, each representing one quadrant, identified with the reference numerals 20, [22, 24] <u>21, 22</u> and 26. Similarly, for an 8PSK constellation as illustrated in FIG. 3, there are 8 decision regions 30, 32, 34, 36, 38, 40, 42 and 44. Each decision region 30-44 is defined by a rotationally symmetric 45° slice of a pie as shown by the dotted lines in FIG. 3. In order to decode the symbols, the bit or symbol decisions are based upon determining the decision region in which the decision variable is located. This technique is known as hard-decision detection.

ATTACHMENT FOR CLAIM AMENDMENTS
VERSION WITH MARKINGS TO SHOW CHANGES MADE
U.S. Serial No. 09/240,275; Filed: January 29, 1999

1. (Amended) A demodulator comprising:

means for receiving modulated signals[,] defining received signals;

a storage device for storing initial decision boundaries for use in demodulating said modulated signals;

means for determining the distance [of] between said received signals relative to [predetermined] said initial decision boundaries;

means for adjusting said [predetermined] initial boundaries as a function of said distance, defining adjusted decision boundaries; and

means for decoding said modulated signals relative to said adjusted decision boundaries.

3. (Amended) The demodulator as recited in claim 1, further including a system for transmitting and decoding a predetermined training sequence defining decoded reference signals and a symbol error counter for comparing said decoded reference [divided] signals to [a said] predetermined training sequence to further improve the bit error rate.

5. (Amended) A demodulator comprising:

means for receiving modulated signals[,] defining received signals;

a storage device for storing a reference constellation;

means for determining the distance between said received signals and [a] said reference constellation;

means for adjusting the location of said reference constellation as a function of said distance defining an adjusted reference constellation and storing said adjusted reference constellation; and

means for decoding said received signals relative to said adjusted reference constellation.

11. (Amended) A method for demodulating a signal comprising the steps of:

(a) receiving modulated signals defining received signals;

(b) storing a predetermined decision boundary for demodulating said received signals;

[(b)](c) determining the distance of said received signals relative to said predetermined decision boundaries;

[(c)](d) adjusting said predetermined boundaries as a function of said distance defining adjusted decision boundaries; [and]

(e) storing said adjusted decision boundaries; and

[(d)] (f) decoding said received signals relative to said adjusted decision boundaries.

13. (Amended) A method for demodulating a signal as recited in claim 11, further including the steps of: transmitting and decoding a predetermined training sequence defining decoded reference signals and providing a symbol error counter [and] for comparing said [divided] decoded reference signals to [a] said predetermined training sequence to further improve the bit error rate.

15. (Amended) A method for demodulating a signal comprising the steps of:

(a) receiving modulated signals[,] defining received signals;

(b) storing a reference constellation;

[(b)] (c) determining the distance between said received signals and a reference constellation;

[(c)] (d) adjusting the location of said reference constellation [is] as a function of said distance defining an adjusted reference constellation; [and]

(e) storing said adjusted reference constellation; and

[(d)] (f) decoding said signals relative to said adjusted reference constellation.